

# MALAY INFANT, CHILD AND MATERNAL MORTALITY AND MORBIDITY IN COLONIAL MALAYA: OBSERVATION FROM BRITISH COLONIAL RECORDS

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## Abstract

Mortality and morbidity rates may be considered to be a sensitive index of general health conditions and could also be regarded as a sensitive indicator of socio-economic development of a country, as they reflect not only the availability of major determinants of health, such as stocks of food and clean water, but also allocation and availability of scarce resources, including financial and health resources. This paper looks at possible causes of Malay infant, child and maternal mortality and morbidity in colonial Malaya based on observations and reports made by medical departments, as statistics based on the registration of births and deaths or hospital admissions are likely to be unreliable throughout the period under study. It highlights the impact of diseases particularly important in infant and maternal mortality, and 'traditional' ways of dealing with them. The influence of Malay customs and midwives on Malay birthing practices in relation to infant and maternal deaths, as suggested in British records, will also be considered.

*Key words: Malay, Mortality, Morbidity, British, Malaya*

## Introduction

The new emphasis on the health of infants and mothers in the 1920s, which reflected ideological changes and local exigencies, saw a stronger population-based approach to health, as more attention was given to Malays, alongside the immigrant communities. This could be seen in a series of efforts to investigate, examine and treat diseases, which could have an impact on the lives of infants, children and mothers. More attention however, was given to infants and school children, when compared to mothers, whose health matters would only be given attention after connections between the health of infants and mothers were established.

In the first decade of the 20<sup>th</sup> century, it was claimed that at least one out of four infants would die in the first year of life, while only two out of three would reach adulthood.<sup>1</sup> It was further claimed that a higher number of Malay infant deaths were reported in Negeri Sembilan<sup>2</sup> and Pahang compared to Selangor,<sup>3</sup> where lower Malay infant mortality was reported. It was not indicated as to why this was apparent, although it should be stressed that statistics, mostly based on the registration of births and deaths or hospital admissions, are likely to be unreliable throughout the period of British administration in Malaya, as deficiencies in the system of reporting births and deaths throughout the period could result in some births or deaths not being reported at all.<sup>4</sup> Despite the claim that the death registration of infants under the age of one year could be fairly relied upon by 1931,<sup>5</sup> it was asserted that this would not include stillbirths and neonatal births, while causes of death in most cases would be unknown or uncertified.

It has been suggested that a higher rate of mortality would normally be associated with the prevalence of diseases, which could be identified and diagnosed through evidence of the symptoms. It should, however, be stressed that the diagnosis of certain diseases, such as those involving nutritional deficiency, could present a challenge to medical officers throughout the period under study, while the multi factorial causality of disease could make it more difficult to arrive at any firm conclusion regarding the determinants and consequences of health trends. The problem in assessing infant mortality in the 19<sup>th</sup> and early 20<sup>th</sup> century was also reported in Britain, as there were alterations in the official requirements for the registration of demographic data in addition to a growing development in the diagnosis and identification of diseases and causes of deaths, which could make it difficult to come to any conclusions regarding infant mortality throughout the period.<sup>6</sup>

It was also asserted that the statistics for maternal mortality, which would normally be calculated as the number of deaths from pregnancy, birth or the lying-in period,<sup>7</sup> could be affected to an unknown extent in Kuala Lumpur, Ipoh, and Taiping. It was suggested that the presence of maternity houses, which received mothers who were 'non-residents of the towns', could result in higher death rates in some urban areas,<sup>8</sup> while the Malay preference to retire to their *kampong* on the occasion of a birth could result in maternal deaths not being recorded in urban areas.<sup>9</sup> Although it could be argued that statistics could be supported by hospital admission records, the Malay lack of enthusiasm for seeking medical treatment resulted in less reliable figures, as mortality among those 'who do not frequent the hospitals' could be 'disproportionately high.'<sup>10</sup> This is the case even though it was only in the 1950s that such a claim could be substantiated.<sup>11</sup> Due to the questionable accuracy of statistics for Malay mortality or morbidity, relevant qualitative information, such as comments and observations given by administrative and medical personnel during the period under study will be extracted from medical and administration reports to assist in the making of interpretative analysis of morbidity or mortality trends and causes.

## **Malay Infant And Child Mortality And Morbidity: Possible Causes**

Infant mortality rate is "one of the most sensitive indicators of changes in public health and tends to reflect conditions which may become evident in the rest of the population later."<sup>12</sup> It could be asserted that the prevalence of infant mortality would become a matter of grave concern to British administration in Malaya. For decades, the causes of infant deaths have remained a subject of debate, particularly due to uncertified or questionable causes of deaths, as death certifications were mostly made by police officers<sup>13</sup> who would in most cases relied on parents' own assessment on causes of death, which could range from a number of probable causes, such as unspecified fever up to convulsions and tetanus neonatorum.<sup>14</sup>

Although it could be suggested that causes of deaths could be determined by post-mortem examinations, it has been claimed that it would be difficult for Medical Departments to perform the procedure without the approval of the relatives of the deceased,<sup>15</sup> whose consent "would never be given if death took place under suspicious circumstance."<sup>16</sup> Even when permission was given by family members, postmortem examination on Malay corpses resulted in negative responses by the public, as reported in Dungun Hospital in 1939.<sup>17</sup> Similar reactions to the procedure were reported in India<sup>18</sup> and the Western countries in the nineteenth century, as it would be considered a 'punishment, a fate worse than death, even while it was serving the purposes of medical knowledge.'<sup>19</sup> Even as late as the 1960s, as Chen asserted, only 13.6% of Malay deaths were certified by medical practitioners or through postmortems.<sup>20</sup> This could contribute to the difficulty in determining Malay causes of death, although some possible causes could be suggested.

In the early 20<sup>th</sup> century, it was suggested that more attention should be given to the treatment of infants after birth than to interference at childbirth, "which probably in most cases is natural and requires no assistance."<sup>21</sup> This was because "no statistics [had] been brought forward to show that the high infantile mortality [was] due to improper treatment at birth."<sup>22</sup> By the 1920s, it was suggested that diseases, such as convulsions, pneumonia, diarrhea, malaria, dysentery,<sup>23</sup> and marasmus<sup>24</sup> could be factors relating to infant mortality, although more emphasis was given to convulsions, which was believed to be the main cause of Malay infant deaths. From a medical point of view, it was suggested that convulsions could be triggered by tetanus neonatorum, acute disorders of the respiratory and digestive system, malaria, or inherited syphilis.<sup>25</sup> The causes of convulsions among Malay infants, however, could not be determined, although it could be associated with malaria, which would be prevalent among Malays. The extent of infection, however, could not be determined, although it was suggested that, "many infants must have died."<sup>26</sup>

By the end of the 1920s more emphasis was given to the health of mothers, particularly during the prenatal and postnatal period,<sup>27</sup> as it was established that it could have some impact on the health of infants.<sup>28</sup> It was claimed that certain diseases, such as syphilis, could be transferable to infants by mothers who felt "quite well and... cannot in any way be responsible for the condition of the baby

and are therefore loathe to undergo any curative treatment,"<sup>29</sup> while 'debility from intercurrent disease' and conditions, such as ankylostomiasis, anaemia of pregnancy<sup>30</sup> and skin diseases<sup>31</sup> could be detrimental to the health of infants. It was also suggested that impact of the diseases, if combined with malnutrition, or complicated by diarrhea, dysentery, or venereal disease, could be more deadly.<sup>32</sup>

It has been suggested that there was a clear connection between malnutrition and diseases or infections, which forms "a circle of interaction."<sup>33</sup> It was indicated, for instance that diseases, which were associated with malnutrition included kwashiorkor,<sup>34</sup> eye disorders, such as Bitot's spots<sup>35</sup> and Keratomalacia, which could lead to blindness,<sup>36</sup> anaemia, infections, diarrhea, and ankylostomiasis or hookworm disease, which played "no small part in the ill health in the kampongs."<sup>37</sup> Although it was suggested that there could be some amount of nutrition or vitamin deficiency diseases among Malays, the assessment of the diseases would be difficult throughout the period under study,<sup>38</sup> as medical officers in rural areas had "little special knowledge of the diseases that may follow inadequate dietary,"<sup>39</sup> which could lower the number of cases reported.<sup>40</sup>

During the period of economic depression, concerns were voiced regarding health and nutritional status of Malay women and children, which could be affected by the slump. Inspections and organized surveys, which were conducted in Selangor,<sup>41</sup> Kuala Pilah, and Kuala Kangsar<sup>42</sup> during the 1930s and early 1940s, revealed that an apparent lack of gross malnutrition in Malay *kampong*,<sup>43</sup> although it was suggested that "the kampong food generally eaten by Malay mothers, especially expectant mothers and nursing mothers, and young children [was] inadequate and often of little 'protective' value."<sup>44</sup> The better health and physique of Malay children, however, was reported in fishing villages and agriculture areas, which may have resulted from the consumption of their own produce.<sup>45</sup> It was asserted that teaching Malays "the advantages of mixed and varied diet" would not be easy, "as they have no interest whatsoever in doctrines and theories concerning proteins, calories or vitamins."<sup>46</sup> It was also claimed that it would be difficult to teach them "the factor of safety"<sup>47</sup> by consuming their own produce, as they are in the "habit of selling or exchanging for the imported articles."<sup>48</sup>

### Diseases and Maternal Mortality

Despite British attention to some diseases, the health of the indigenous population remained "vigorously denied" throughout the 1920s,<sup>49</sup> although some attention was given to their health by the 1930s. Lesser attention was given to health of Malay women, as could be seen in less known information on their health status, particularly in the 19<sup>th</sup> and early 20<sup>th</sup> century. Although this could indicate a British lack of interest in health matters, Malay hesitations in seeking medical treatment at hospitals could also be a factor. A similar observation was made in India, as not much was known regarding the health of Indian women due to physical inaccessibility of some of the high caste Hindu and Muslim women. In most cases, added Arnold, women would avoid hospitals, although this would not suggest that the health of women was totally neglected. It was asserted that Christian

missionaries such as the London Missionary Society and The Church of England Zenana Missionary society were particularly active in their attempt "to bring health and education, (as well as Christianity) to the secluded women's quarters of Indian households,"<sup>50</sup> although a similar attempt by missionaries in the Federated Malay States would be resisted.

The appointment of Lady Medical Officers could be seen as a British attempt to accommodate Malay needs, although more emphasis would be given to the health of infants, particularly after the establishment of Infant Welfare Centres. It was claimed that women patients "must either be admitted to hospital or wait for one special afternoon set aside each week for examination at the hospital of gynaecological patients," or come to the centre for medical consultations or treatments.<sup>51</sup> Limited access to medical facilities, reservations in terms of hospitalisation, and limited attendance at Infant Welfare Centres could limit Malay women's chances of seeking medical assistance, particularly when it was asserted that aside from infants, toddlers and young nursing mothers, other cases would not be considered as a "part of the real work of the centre."<sup>52</sup>

It was suggested that priorities would be given to the diagnosis and treatment of diseases which could affect infants, such as venereal diseases, which could be the cause of abortion and still births,<sup>53</sup> beriberi and post-puerperal beriberi, which could affect the mother's ability to lactate, and could be transferable to infants through breast-milk,<sup>54</sup> and malaria<sup>55</sup> which could lead to miscarriages, stillbirths, pre-term deliveries and low birth-weight babies.<sup>56</sup> British efforts towards Malays would be more directed towards beriberi and malaria, although it would not indicate that efforts to treat and control venereal diseases were absent.

Beriberi was regarded as being associated with the consumption of polished rice<sup>57</sup> particularly among the Chinese,<sup>58</sup> although this does not explain the prevalence of the disease among Malays who mainly consumed "eminently safe" rice, which they grew and pounded.<sup>59</sup> By the mid 1930s, it was suggested that the disease could be "directly related to the degree of prosperity of the community,"<sup>60</sup> as this would enable them to buy the more expensive, highly polished rice, which would be lower in Vitamin B. A survey in the coastal districts of Selangor in 1938 showed that there was a tendency of Vitamin B deficiency in almost every Malay household, which could be due to the consumption of polished rice. As was stressed in the Annual Medical Report of 1938:

In the past, the home under-milled rice consumed by the peasants has been the only appreciable source of vitamin B, and even then minor deficiency diseases were much in evidence, although frank cases of Beriberi have been rare amongst kampong Malays. Now, that polished rice is being produced in the kampongs it is anticipated that not only will minor deficiencies and the infantile death rate increase, but Beriberi will become common.<sup>61</sup>

The disease was believed to be one of the causes of Malay maternal deaths, as it appeared to attack them during the second week before the disappearance of the

uterine blood. It was claimed that treatment for the disease by rice polishing tablets and injections of synthetic vitamin B products appeared to reduce the incidence among groups of people formerly decimated by it, such as prisoners or mine workers, although it would not be effective in controlling the disease among Malays after childbirth.<sup>62</sup>

Towards the end of the 1930s, a large number of women outpatients were reportedly suffering from anaemia “which becomes extreme if pregnancy supervenes,” and its complications, such as irregular and defective menstruation, and general weakness, which could be caused by malaria.<sup>63</sup> The disease was prevalent among Malays, as could be seen in occasional reports on the disease in the Malay states, although the extent of the infection was not known. In 1940, for example, the disease struck two small villages of Istana Raja and Pilin in Negeri Sembilan and caused many deaths. Impact of the disease for a “prepared community,” such as the people of Pulau Tioman on the other hand, would be less devastated, as the disease would be common amongst them, although it could still lead to death.<sup>64</sup> The number of Malay deaths however, remained unknown.

It could not be ascertained whether maternal mortality had been rife in the 19<sup>th</sup> or early 20<sup>th</sup> century, as it was only in the mid 1930s that maternal mortality was first reported. It was suggested that the maternal mortality rate in 1935, which was “the cause of grave anxiety” to British administration would be one death per 100 births<sup>65</sup> with the highest mortality reported amongst Indians, and with mortality being “still less, but still serious for Malays, and least for Chinese.”<sup>66</sup> Although the reliability of the statistics could not be determined, the prevalence of maternal deaths was reportedly due to eclampsia, infection, hemorrhage, and the conditions of labour and puerperium, such as bleeding, which could be attributed to Malay beliefs, practices and traditions.

### **Malay Beliefs, Practices, and Traditions: Impact on Infant and Maternal Mortality**

Malays revered their customs, or *adat*,<sup>67</sup> which represented the strong forces that governed their lives.<sup>68</sup> The *adat*, which is a comprehensive code of behavior and forms of ceremony, is usually nurtured in individuals through “informal forces of socialization,” such as family, elders, and neighbours. For this reason, claimed Wazir, *adat* “rests more comfortably on the Malays in the sense that it is also more spontaneously understood and shared.”<sup>69</sup> Carolina Lopez, while agreeing that *adat* plays a strong role in determining how people acted in society, stressed that it was “closely tied” with the Islamic religion.<sup>70</sup> This could be seen, for example, in the high position of their religious leaders, such as *imam* or *mufti* in Malay society,<sup>71</sup> and the practice of female circumcision<sup>72</sup> or clitorodotomy, which would be considered as a part of Islamic and Malay tradition. The practice, which would involve a tiny incision of the clitoris with a razor blade or knife where only a “microscopic amount” of tissue is removed, observed Laderman, would not be enough to “impair the organ’s function but sufficient to satisfy tradition.”<sup>73</sup>

It could be suggested that past and present Malay beliefs and ideas were incorporated into their pregnancy and birth practices, as denoted by their *adat*, although it would receive criticism from religious authorities. The ceremony of *lenggang perut* (rocking the abdomen), which was performed during the seventh month of pregnancy<sup>74</sup> to ease childbirth for example, was denoted by the Malay *adat*, although it could be considered un-Islamic. Malay belief in the power of spirits was also frowned upon by religious men,<sup>75</sup> as it “ascribed validity” to entities “far exceeding anything allowed them by the Koran.”<sup>76</sup> This belief could be seen in Malay measures to protect mother and child from evil spirits<sup>77</sup> and demons,<sup>78</sup> such as *hantu penanggalan* or “bodiless female vampire from whose head hang coils of yellow intestines,”<sup>79</sup> *hantu air* or the ghost of the water, *hantu pelesit* or the ghost under the control of women,<sup>80</sup> spirits of still-born child or *mati anak*,<sup>81</sup> which could cause illnesses to the child and *gila meroyan*,<sup>82</sup> *hantu sawan*, which could cause convulsions,<sup>83</sup> and three brother spirits, which could cause smallpox, chickenpox, and measles.<sup>84</sup> It would be due to the assumption that diseases could be caused by spirit interventions and could be either prevented or treated by Malay ‘traditional’ preventive or curative measures<sup>85</sup> that medical assistance would be unlikely to be sought during its occurrences.

Malays, suggested Manderson, would consider pregnancy as a normal and not “an overly vulnerable” state which might require medical attention.<sup>86</sup> Women from traditional societies, such as Malays, asserted Hillier, trusted their own knowledge on matters regarding childbirth, which contrasted significantly with ‘modern’ Western midwifery practices where pregnancies were monitored, birth dues determined, and medical interventions would be considered necessary to speed up birth processes in cases of overdue pregnancy or prolonged labour.<sup>87</sup> The differences between the Malay and Western notion of midwifery determined Malay responses to hospital births and confinements, and trained Malay midwives.

Although Malay belief and practices surrounding pregnancy and birth might seem curious to outsiders, each practice would have cultural significance, which could have some bearing on health from Malay point of view. The value of harmony between man and the universe, for example, has been enriched through the directional system where birth should take place, which face either south or west and avoiding the north. To prevent illnesses to infants or mothers, Malays also observed proper treatment of the placenta with salt and tamarind<sup>88</sup> and added with additional items, such as nails, coconut shell or empty tin before burying it in ground free from stagnant water,<sup>89</sup> although this could not be scientifically proven.

Based on “an understanding of and a respect for local beliefs and values,” which formed the ideals of Malay society,<sup>90</sup> the position of the Malay *bidan*, or midwife outranked the *imam*, or even relatives on the occasion of pregnancy and birth. As an acclaimed expert in her field, the *bidan* would be expected to advise mothers on restrictions, proscriptions and sets of rules and regulation, which would “dictate how a woman ought to feel and act” throughout pregnancy, based on their belief and *adat*.<sup>91</sup> This could either be in the form of practical advice to mothers, such as to avoid falls and beatings<sup>92</sup> to prevent miscarriages,<sup>93</sup> or sympathetic magic, such as not tying cloth around the neck to prevent the

umbilical cord from looping around the baby's throat, or avoiding sitting in the doorway or on steps to avoid blockage or difficult labour.<sup>94</sup> The father would also be advised not to shave any hair, kill fowls, drive a stray dog from the compound with violence, or hurt any living thing during pregnancy, to avoid "a prejudicial effect on the child, and cause a birth-mark and even actual deformity, such affliction being called *kenan*"<sup>95</sup> or even death to his child.<sup>96</sup> Despite the claim that Malay restrictions or *pantang* were "another form of 'abnormal' social reaction that perpetuated the link between a woman's reproductive functioning and her oppressed gender behaviour,"<sup>97</sup> it could be argued that the prescription of *pantang* to both the Malay mother and father in Malay society would suggest that this was probably not the case.

Malay food restrictions to mothers, claimed Dixon, gave some "valuable emotional comfort in believing that one is behaving in culturally endorsed ways,"<sup>98</sup> although it would not have a strong scientific rationale, supported by medical evidence, or reflect a good knowledge of nutrition.<sup>99</sup> The influence of Malay *bidan* and next of kin resulted in an observation of the restriction, as those who failed to observe it might be considered "a bit of a fool," although they would not be considered a sinner.<sup>100</sup> Prescription or proscription of food, however, would be made based on body 'humoral' proportions, which would differ from one to another. Pregnancy or *berbadan dua*<sup>101</sup> would be considered to be a 'hot' state and would require the prescription of 'cold' food, which would have higher water content, less protein and fat, lower carbohydrate and fewer calories, such as certain fruits and vegetables.<sup>102</sup> Although 'hot', 'itchy', 'poisonous', 'sharp', and 'windy' foods,<sup>103</sup> it was asserted that pregnant woman's *idam* or cravings should be indulged to prevent the child from continuously drooling once they were born.<sup>104</sup> Similar observations were made in Thailand and the Philippines, although an unsatisfied craving was believed to cause the mother to drool, child deformity or even miscarriage. This indulgence, however, would not suggest that a pregnant woman would be allowed to have everything her heart desired, as the most important rule was that food should be taken in sensible quantity<sup>105</sup> to avoid 'big' fetus and thus prolonged or difficult labour.<sup>106</sup>

Malays believed that birth changed the mother's humoral proportions to 'cold', due to a loss of blood, which was 'hot' in nature.<sup>107</sup> Following changes in the body, Malays turned to 'hot' treatment, which would include a prescription of 'hot' food and treatment and proscription of the 'cold',<sup>108</sup> which could "clot the uterine blood and impede the flow, causing it to go backwards into the body and cause nervousness or insanity."<sup>109</sup> Exposures to cold wind and water would also be avoided, as it could prevent delay recovery, and cause "wind related illnesses", such as chronic joint pain, headaches, and abdominal pain in later life.<sup>110</sup>

Despite Malay belief in their 'traditional' pregnancy and birthing practices, some practices would be allegedly responsible for ill health, or even death among Malay mothers.<sup>111</sup> It was claimed that the most harmful aspect of Malay practices surrounding pregnancy and birth would be the unhygienic and sometimes dangerous practices of Malay midwife or *bidan* who lacked the necessary skill and competency to identify and deal with problems and complications during



pregnancy and labour. The *bidan* methods of inducing birth by massaging the uterus and using a rolled-up sarong, which would be tied above the uterus to keep the foetus from rising,<sup>112</sup> and pulling on umbilical cord in an undue delay in the expulsion of placenta was claimed to be the cause of postpartum hemorrhage among mothers.<sup>113</sup> These practices, added to the usage of the *bidan's* heel or coconut husk to guard the perineum from tearing<sup>114</sup> and cutting of umbilical cord with sharp sliver of bamboo and rubbing it with ashes<sup>115</sup> or a mixture of pepper, turmeric, and ginger<sup>116</sup> were criticised by medical authorities, as they could lead to infection, convulsion and tetanus neonatorum among Malay infants. The symptoms, which include squinting and rolling of the eyes, twitching and stiffness of the fingers and neck, however, could easily be deemed to be the work of spirits,<sup>117</sup> which could in turn increase Malay dependence on their medical specialists.

By mid 1930s, it was suggested that the prevalence of Malay maternal mortality was "probably attributable to the customs and practices observed during confinement,"<sup>118</sup> which could last between 40<sup>119</sup> to 44 days.<sup>120</sup> Although the mother's confinement to bed and light household duties<sup>121</sup> and body massages could be considered beneficial to health, other practices however, would receive criticisms from medical professionals. It was claimed that the practice of *bertungku* or abdominal massage using heated earth-stones or heavy irons could cause uterine displacement among mothers.<sup>122</sup> Malays however, believed that the practices were necessary to "dry out the womb,"<sup>123</sup> increase the 'hot' blood circulation and heat the body,<sup>124</sup> prevent illnesses and assist the mother in getting back her youthful figure.<sup>125</sup>

Malay 'traditional' diet during postpartum period, which consisted of rice, dried fish, pepper and ginger was also claimed to be "inadequate and badly balanced"<sup>126</sup> and could weaken both mother and child,<sup>127</sup> affect future pregnancies,<sup>128</sup> and reduce the mother's ability to lactate, which could reduce infant chance of survival.<sup>129</sup> A study in the 1970s, however, concluded that the diet would have no effect on lactation, as "neither the volume nor composition of their milk was detrimentally affected."<sup>130</sup> It was also suggested that the practice could lead to maternal death,<sup>131</sup> although no proof was given to substantiate this claim.<sup>132</sup> Even with a criticism of the 'traditional' practice, it was observed that some Malays would hold on to the practice even after the independence of Malaya, although the level of strictness could vary.<sup>133</sup>

## Conclusion

The principal causes of Malay infant and maternal mortality and morbidity during the colonial period, based on observations and comments of medical officers, were diseases, which could be caused by economic development, socio-economic conditions and unsanitary conditions, Malay 'traditional' practices, and carelessness or ignorance on the part of mothers and Malay midwives. It would be difficult to correctly determine diseases which could be associated with Malay infant and maternal mortality due to the less availability and reliability of statistical

records. However, it could be suggested that Malay beliefs and practices surrounding pregnancy and birth was considered the main factors of Malay maternal deaths and received most condemnations by colonial medical authorities. It remains to be examined in future research whether criticisms to the allegedly dangerous Malay birthing practices, despite the lack of scientific evidences as support, were made to justify British effort to introduce Western modern midwifery services in Malaya. Some of the 'traditional' Malay practices, particularly surrounding birth were still observed to some extent in some states in Malaysia, although the level of strictness could vary.

## Endnotes

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<sup>2</sup>Federated Malay States Annual Report for 1912', p. 31.

<sup>3</sup>Report of the Registrar-General of Births and Deaths, Supplement to the Federated Malay States Government Gazette', p. 5.

<sup>4</sup>Sel. Sec. 3063/1921, 'Infantile Mortality Kuala Lumpur Establishment of Creche', p. 2.

<sup>5</sup>Annual Report of the Medical Department for 1931', p. 7.

<sup>6</sup>Carol Dyhouse, "Working-Class Mothers and Infant Mortality in England, 1895-1934," *Journal of Social History*, 12 no. 2 (1978), p. 250.

<sup>7</sup>Judith L. Richell, *Disease and Demography in Colonial Burma*, (Singapore: NUS Press, 2006), p. 137.

<sup>8</sup>Sel. Sec. Gen. 1380/29, 'Address of His Excellency the High Commissioner at the Meeting of the Federal Council', 4<sup>th</sup> November 1929, No. 29, p. 506.

<sup>9</sup>Sel. Sec. Gen. 134/1934, 'Annual Report 1933 Medical and Health Department Selangor'.

<sup>10</sup>Annual Report of the State of Negeri Sembilan for the Year 1897', p.11.

<sup>11</sup>Florence Adam Thomson, "Child Nutrition: A Survey on the Parit District of Perak, Federation of Malaya," *Bulletin Institute Medical Research Malaya*, 10 (1960), p. 21.

<sup>12</sup>Paul C. Y. Chen, "Child Health in Malaysia 1870 – 1985," *Medical Journal of Malaysia*, 40 no. 3 (1985), pp. 165-76.

<sup>13</sup>Sel. Sec. 3584/1923, 'Engagement of Additional Staff for Infant Welfare Work', p. 2.

<sup>14</sup>Manderson, "Blame, Responsibility and Remedial Action", p. 258.

<sup>15</sup>Sel. Sec. Gen. 506/1931, 'Annual Report 1930, Health Officer, Kuala Lumpur', pp. 19-21.

<sup>16</sup>Kelantan 857/1931, 'Asks for an Interview with the Honorable the British Adviser to Discuss Certain Matters which Touch the Welfare of the Malays Residing in Rural Districts'.

<sup>17</sup>Thumboo John Danaraj, *Japanese Invasion of Malaya and Singapore: Memoirs of a Doctor*, (Kuala Lumpur: T. J. Danaraj, 1990), p. 5.

<sup>18</sup>David Arnold, *Colonizing the Body: State Medicine and Epidemic Disease in Nineteenth-Century India*, (Berkeley, Los Angeles and London: University of California Press, 1993), p. 6.

<sup>19</sup>R. Richardson, *Death, Dissection and the Destitute*, (London: Penguin, 1988), pp. 32-4; Deborah Lupton, *Medicine as Culture: Illness, Disease and the Body in Western Societies*, (London: Sage, 1994), pp. 44-5.

<sup>20</sup>Paul C. Y. Chen, "The Traditional Birth Attendant and Neonatal Tetanus: The Malaysian Experience," *Journal of Tropical Pediatrics*, 22 no. 6 (1976), p. 263.

<sup>21</sup>Sel. Sec. 3711/1915, 'Treatment of Midwifery Cases'.

<sup>22</sup>Ibid.

<sup>23</sup>Various Authors, *The Institute for Medical Research 1900-1950*, (Kuala Lumpur: Government Press, 1951), p. 181.

<sup>24</sup>'Annual Report of the Health Officer Kuala Lumpur for the Year 1928', p. 7.

<sup>25</sup>'Report of the Registrar-General of Births and Deaths, Supplement to the Federated Malay States Government Gazette, 2<sup>nd</sup> September 1933', p. 7.

<sup>26</sup>Sel. Sec. Gen. 506/1931, 'Annual Report 1930, Health Officer, Kuala Lumpur', pp. 19-21.

<sup>27</sup>Adviser of Perlis 125/1356, 'The Relation of Nutrition to Public Health'.

<sup>28</sup>'Proceedings of the Federal Council of the Federated Malay States for the Year 1920'.

<sup>29</sup>'Annual Report of the Medical Department Federated Malay States for 1926', p. 141.

<sup>30</sup>Kelantan 298/1936, 'Infantile Mortality on Estates'.

<sup>31</sup>Kelantan 579/1935, 'Maternity and Infant Welfare in the Unfederated Malay States'.

<sup>32</sup>'Pahang Administration Report for the Year 1919', p. 23.

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